



## Curcumin and Turmeric

### What Are Their Potential Health Benefits?

Turmeric is the spice that gives curry its yellow color and has been used in India for thousands of years as a food spice, a pigment in food dyes and as a medicinal herb. Turmeric contains certain compounds called curcuminoids, the most important of which is curcumin.

Curcumin is the main active medicinal ingredient in turmeric. There is a large amount of research supporting the potential health benefits of curcumin; primarily, it's powerful anti-inflammatory effects, as well as being a very strong antioxidant. However, the curcumin content of turmeric is quite low - around 3%, by weight. Further, once curcumin is absorbed it is quickly metabolized and excreted. A significant issue has been that curcumin is poorly absorbed from the intestinal tract yielding *low* bioavailability levels to the bloodstream. The challenge has been to formulate curcumin into a highly absorbed product yielding a high bioavailability to the body, including the brain. Interestingly, adding black pepper (piperine or bioperine) enhances the absorption of curcumin. There is a relatively new formulation that reduces curcumin molecules to a nano-particle size with improved absorption and providing a high blood circulation bioavailability (discussed later).

Curcumin has been extensively studied in both animals and humans and with outcomes providing several extremely important health benefits, including:

#### 1. **Anti-Inflammatory.**

Inflammation helps the body fight foreign invaders and also plays a role in repairing cell damage. Without the body's ability to launch an inflammatory response, pathogens like bacteria and viruses could easily consume our bodies and kill us. Although acute (short-term) inflammation is beneficial in the healing process, it can become a major problem when it is chronic (long-term) and/or inappropriately targets the body's own healthy tissues, as in auto-immune diseases. It is now well established that chronic, low-level inflammation plays a major role in almost every chronic Western disease. This includes: heart disease, cancer, metabolic syndrome, diabetes, auto-immune diseases, dementia and Alzheimer's. Therefore, anything that can help fight chronic inflammation is of potential importance in preventing and even treating these diseases. Studies confirm that **curcumin** has strong anti-inflammatory properties. Its potency has compared favorably to anti-inflammatory pharmaceutical drugs - without any of their side-effects.

#### 2. **Cell Oxidation.**

*Oxidative stress* causes damage to the body's cell DNA and is believed to be one of the mechanisms behind aging as well as an underlying cause of many diseases. It involves *free radicals*, which are *highly reactive* molecules with unpaired electrons. Free radicals tend to react with important organic substances important to the body's cellular metabolism, such as fatty acids, cell proteins and DNA. The main reason antioxidants are so beneficial, is they inactivate free radicals protecting our bodies and the resulting damage they cause.

Curcumin happens to be a potent *antioxidant* that can neutralize free radicals (due to its chemical structure). Further, curcumin also boosts the activity of the body's own antioxidant

enzymes. Therefore, curcumin delivers a one-two punch against free radicals. It blocks them directly and stimulates the body's own antioxidant mechanisms.

### 3. **Curcumin Boosts Levels of the Brain Hormone, BDNF (*Brain-Derived Neurotrophic Factor*).**

**BDNF** is a hormone found in the brain, which increases the growth of new brain cells (neurons) through a process called *neurogenesis*. **BDNF** also fights various degenerative processes in the brain. [Side Story: When I attended medical school, I was taught that the neurons of the brain were not able to divide and multiply after early childhood. When damaged, the nerve cells were gone, forever. However, this is now known to be false.] Neurons are capable of forming new connections and in certain areas of the brain, they can also multiply and increase in number. Many common brain disorders have been linked to decreased levels of this hormone, including depression, anxiety, dementia and Alzheimer's disease. Interestingly, curcumin can *increase* brain levels of **BDNF**, including the hippocampus area of the brain. As such, it may be effective at delaying or even reversing many brain diseases and age-related decreases in brain function, thereby, potentially helping improve memory. (Refer to the UCLA curcumin study described later.)

### 4. **Beneficial Role in Heart Disease.**

Curcumin improves the health and function of the endothelium lining of the walls of all arteries, including those of the heart. It does this through its potent anti-inflammatory and antioxidant properties. It is well known that the cholesterol deposits in the lining of arteries (called plaque or atherosclerosis) is a result of inflammation that develops within this lining. This is referred to as *endothelial dysfunction* and tends to be a progressive process leading to sudden rupture of the endothelial capsule of the plaque, clot formation and blockage of the artery – e.g. a heart attack or stroke. Curcumin may help prevent or even reverse the progression of cholesterol plaque progression by improving the health and function of the endothelium. Several studies suggest that curcumin does lead to such improvements in endothelial function, (as does aerobic exercise and statin drug therapy).

### 5. **Curcumin May Help Prevent (and perhaps even treat) Cancer.**

Cancer is a disease, characterized by uncontrolled growth of cells of a tissue or organ. While there are many different forms of cancer, they do have several commonalities, some of which appear to be influenced by curcumin supplementation. Research studies have shown that curcumin can reduce *angiogenesis* (growth of new blood vessels within tumors), reduce *metastasis* (spread of cancer), as well as contribute to the death of cancerous cells. Multiple studies have shown that curcumin can reduce the growth of cancerous cells in the laboratory and inhibit the growth of tumors in test animals. Whether high-dose curcumin can help treat cancer in humans has yet to be fully tested, but it looks promising in animal research and clinical studies are reportedly underway.

### 6. **Curcumin's Possible Role in Dementia & Alzheimer's Disease**

Alzheimer's disease is the most common neurodegenerative disease in the world and is a leading cause of dementia. In spite of many millions of dollars being spent on finding a cure, so far there is no successful treatment for Alzheimer's. Therefore, preventing it from developing in the first place is a focus of utmost importance. It is well established that inflammation and oxidative damage to the neuron cells in the brain and their synapses (interconnections) play a dominant role in the development and progression of Alzheimer's disease. A key feature of Alzheimer's disease is a buildup of protein deposits called *amyloid plaques* (not to be confused with cholesterol plaque in the arteries) and the formation of nerve fiber tangles, called *tau*, that interfere with communications between neurons, resulting in

memory loss and a decline in bodily functions. As indicated earlier, curcumin has beneficial effects on both *inflammation and oxidative damage* within the body's cells, including the brain. Curcumin has been demonstrated to *cross the blood-brain barrier* in animal studies, when there are adequate blood levels and importantly, can help *remove* amyloid plaques and the nerve fiber tangles, tau. However, clinical trials in humans have failed to demonstrate this benefit. The problem has been that most curcumin products used in these trials have had poor absorption and therefore, low bioavailability.

The validity of the hypothesis that adequate absorption, blood bioavailability and blood-brain levels of curcumin is necessary was recently demonstrated in a small pilot study conducted at UCLA and presented at the *Alzheimer's Association International Conference* in London, U.K. The paper is entitled: *Memory and Brain Amyloid and Tau Effects of a Bioavailable Form of Curcumin in Non-Demented Adults: A Double-Blind, Placebo-Controlled 18-Month Trial*. [You can review the entire report at: <https://doi.org/10.1016/j.jagp.2017.10.010>] The study used a relatively new formulation of curcumin called *Theracurmin HP* and has demonstrated blood levels **27 times** higher than other commercially formulated curcumin products. The authors conducted a randomized, double-blind 18-month study on 40 subjects (aged 50-90 years) with cognitive scores and histories consistent with normal aging or mild neurocognitive disorder (MCI). Both cognitive testing and live (in vivo) PET scans of the brain were used to assess changes in multiple areas of the brain. Test subjects received either a placebo or *Theracurmin HP* (curcumin 90 mg), taken *twice daily* for 18 months. All subjects receiving curcumin showed significant improvement in all cognitive test scores compared with the placebo group. Further, the PET scans of the curcumin group showed a reduction in amyloid plaque and tau binding tangles in the areas of brain controlling memory, when compared to the placebo group. The authors concluded "that a relatively inexpensive and nontoxic treatment may have a potential for not only improving age-related memory decline, but also preventing or possibly staving off progression of neurodegeneration and eventually, future symptoms of Alzheimer's Disease. (I want to point out that this is a small pilot study and that a larger study is reportedly underway to confirm these initial findings.)

I also want to emphasize that Alzheimer & dementia treatment protocols used in many research centers consistently include the healthy longevity lifestyles I promote for the prevention of heart disease, stroke, diabetes, cancer and auto-immune diseases. These lifestyles include: *regular aerobic exercise, eating a heart healthy diet, managing stress through meditation, adequate sleep, not smoking, challenging the brain by learning new tasks and skills, and social interaction*. Additionally, two recent studies of estrogen replacement in menopausal women have demonstrated a reduction in the incidence of Alzheimer's by up to 50% after 20 years of use. [Refer to my article: *Menopause and Estrogen Therapy*.]

So, there is much we can do to help reduce or prevent the onset and/or progression of cognitive decline. Until there is a proven medical cure for dementia, the key to minimizing your risk is being absolutely consistent in your lifestyle behaviors. Whether curcumin can slow down or even reverse the progression of Alzheimer's and other cognitive diseases needs to be studied further. However, the data is encouraging.

## **7. Additional Benefits of Curcumin Supplementation:**

- **Arthritis Patients Respond Well to Curcumin.**

Arthritis is a common disorder characterized by joint inflammation. Many studies have shown that curcumin can help treat the pain and swelling symptoms of arthritis and is in some cases more effective than anti-inflammatory drugs.

- **Curcumin Can Benefit Depression**

Curcumin has shown some promise in treating depression. And it may be a helpful adjunct with anti-depressants. In a controlled trial, 60 patients were randomized into three groups: One group took Prozac, another group took a gram of curcumin and the third group took both Prozac and curcumin. After 6 weeks, curcumin had led to improvements that were similar to Prozac. The group that took both Prozac and curcumin fared best.

NOTE: Depression is also linked to reduced levels of brain-derived neurotrophic factor (**BDNF**) (discussed earlier) and a shrinking hippocampus, an area of the brain with an important role in learning and memory. As discussed earlier, curcumin boosts BDNF levels, potentially reversing some of these changes. There is also some evidence that curcumin can boost the brain neurotransmitters, *serotonin and dopamine*, to relieve anxiety.

### **Conclusion:**

Obviously, anything that reduces inflammation and oxidation in our body should have a beneficial effect on reducing their impact on heart disease, cancer, dementia and Alzheimer's disease. A growing body of evidence strongly suggests that curcumin can play such a role on potentially improving both longevity and the quality of life as we age (along with the lifestyle behavior cornerstones I described earlier).

As curcumin products are sold as a supplement and are not regulated by the FDA, it is important to do your research to find quality products that are proven to be highly absorbed, safe and beneficial. Based on the evidence I have reviewed to date; my current recommendations are *Theracurmin HP* (Integrative Therapeutics) [1 capsule twice daily] **or** *Turmeric Supreme Extra Strength with Black Pepper* (Gaia Herbs) [2 capsules twice daily].

Choose your lifestyle behaviors and supplements wisely and be consistent. All the evidence clearly shows that it will preserve your quality of life.

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